Assignment 5

<u>Exponents and Radicals</u>

Textbook Assignment: Chapter 7 (65-77)

5-1. Another name for the square root sign, $\sqrt{\ }$, is the
1. extraction sign
2. radian sign
3. factor sign
4. radical sign

5-2. Which root of 27 is indicated by the expression $\sqrt{27}$?
1. The first root
2. The cube root
3. The square root
4. The quadratic root

5-3. What is the meaning of $\sqrt[4]{625}$?
1. The number which when multiplied by itself 4 times is equal to the square root of 625
2. One-half of the square root of 625
3. The fourth root of 625
4. 625 to the fourth power

5-4. Which number is the cube root of 8?
1. 2
2. $\frac{8}{3}$
3. 24
4. 512

5-5. Which number is the third power of 1.5?
1. 0.015
2. 0.5
3. 2.25
4. 3.375

5-6. If a negative number is raised to the 54th power, what is the sign of the result?
1. It depends on the base.
2. It fluctuates.
3. It is positive.
4. It is negative.

5-7. What type number is the square root of 28?
1. Rational
2. Imaginary
3. Integral
4. Real

5-8. What type number is the square root of -9?
1. Irrational
2. Integral
3. Real
4. Imaginary

5-9. The cube of $-\frac{1}{2}$ can be written as
1. $\left(\frac{-1}{2}\right)^3$
2. $-\left(\frac{1}{2}\right)^3$
3. $\frac{(-1)^3}{(2)^3}$
4. any of the above

5-10. In which other way may $\left(\frac{3}{7}\right)^4$ be written?
1. $\frac{3}{7^4}$
2. $\frac{3^4}{7^4}$
3. $\frac{4^3}{7}$
4. $\frac{4^7}{4^3}$

5-11. The fifth real root of $\frac{-1}{32}$ is equivalent to
1. $\frac{-1}{2}$
2. $\frac{1}{-2}$
3. $-\left(\frac{1}{2}\right)$
4. Each of the above

5-12. If a three-decimal place number is raised to the fourth power, the result will have seven decimal places.

5-13. What is the value of $\sqrt[3]{m^3}$?
1. 1
2. m
3. m^3
4. m^6

5-14. What is the product of $2^2 \times 2^3$?
1. 2^5
2. 2^6
3. 4^5
4. 4^6

5-15. If exponents are added in the multiplication process, the bases must be equal.

5-16. Using the law of exponents for multiplication, what is the product of $3^4 \times 4^3$, if any?
1. 3^7
2. 4^7
3. 12^7
4. It is impossible to indicate a product under this condition.

5-17. To divide one power of a base by another power of the same base, raise the base to the power found by subtracting the exponent in the divisor from the exponent in the dividend.

5-18. What is the quotient obtained by dividing 8^6 by 8^4?
1. 1^2
2. 8^{-2}
3. $8^{1.5}$
4. 8^2

5-19. What does the example $(2^3)^4$ illustrate?
1. The multiplication of a root by a power
2. The addition of two exponents
3. The law of double exponents
4. The power of a power

5-20. The example $(4^3)^2$ is interpreted to mean
1. 4^5
2. $4^3 \cdot 4^3 \cdot 4^3$
3. $4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$
4. $4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$

5-21. Which of the following is the result obtained when the term 5^4 is cubed?

1. $5^{\frac{3}{4}}$
2. $5^{\frac{4}{3}}$
3. 5^7
4. 5^{12}

5-22. The expression $(2 \cdot 2 \cdot 2)^3$ is equivalent to
1. 2^6
2. 2^9
3. 18
4. 216

5-23. What is the value of $(2^4 \cdot 4^2)^2$?
1. 4^{16}
2. 8^{16}
3. 256
4. $(256)^2$

5-24. What is the value of $\left(\frac{34}{102}\right)^3$?

1. 1
2. $\frac{1}{3}$
3. $\frac{1}{27}$
4. $\frac{62}{1728}$

5-25. The expression $(4.5)^0$ is greater than 4^0.

5-26. What is the sum of 9^0 plus 9^1?
1. 0
2. 1
3. 9
4. 10

5-27. The expression 7^{-1} has the same value as $\frac{1}{7}$

5-28. The zero power of 2 plus the zero power of 5 equals
1. zero
2. 1
3. 2
4. the zero power of 7

5-29. Which of the following expressions is equivalent to $\frac{7}{4^{-2}}$?

1. $1 + \frac{7}{4^2}$
2. $\frac{4^2}{7}$
3. $\left(\frac{4}{7}\right)^2$
4. $7(4^2)$

5-30. A negative exponent has no meaning but is introduced to complete the set of exponents.

5-31. Of the expressions, 2^{-7}, $\left(\frac{1}{2}\right)^7$, $-(-2)^{-7}$, and $\frac{1}{(2)^7}$, which are equal?

1. 2^{-7} and $\left(\frac{1}{2}\right)^7$

2. $-(-2)^{-7}$ and $\frac{1}{(2)^7}$

3. $\left(\frac{1}{2}\right)^7$, 2^{-7}, and $-(-2)^{-7}$

4. All are equal.

5-32. What is the value of $\frac{1}{5^{-4}}$?

1. 5^4
2. $\frac{1}{625}$
3. 4^5
4. $\left(\frac{1}{5}\right)^4$

5-33. What is the relationship between $\sqrt{16}$ and $(16)^{\frac{1}{2}}$?

1. $\sqrt{16} > (16)^{\frac{1}{2}}$
2. $\sqrt{16} < (16)^{\frac{1}{2}}$
3. $(16)^{\frac{1}{2}}$ is 4 more than $\sqrt{16}$
4. They are equal.

5-34. The expression $(4^3)^{\frac{1}{3}}$ is equal to

1. $\frac{1}{4^3}$
2. 4
3. $\left(\frac{1}{3}\right)\left(4^3\right)$
4. $4^{(3^{\frac{1}{3}})}$

5-35. What is the value of $32^{\frac{2}{5}}$?

1. 4
2. 8
3. $5\sqrt{924}$
4. $16^{\frac{1}{5}}$

5-36. The expression $3^{\frac{5}{2}}$ can be changed to another form by the steps

1. $3^{\frac{5}{2}} = \frac{3^5}{1^2} = 3^5$
2. $3^{\frac{5}{2}} = \sqrt[5]{3^2} = \sqrt[5]{9}$
3. $3^{\frac{5}{2}} = 3^{2 + \frac{1}{2}} = 3^2 \cdot 3^{\frac{1}{2}} = 3^1 = 3$
4. $3^{\frac{5}{2}} = 3^{2 + \frac{1}{2}} = 3^2 \cdot 3^{\frac{1}{2}} = 3^2\sqrt{3}$

5-37. The value of $(8^0)^5$ is the same as $(8^5)^0$.

5-38. What is $7^{\frac{2}{3}}$ expressed in radical form?

1. $\sqrt[3]{7^2}$
2. $\sqrt[3]{7^3}$
3. $\sqrt[3]{2^7}$
4. $\sqrt[2]{7^3}$

5-39. What is the decimal equavalent of 10^{-5}?
1. 0.01
2. 0.001
3. 0.0001
4. 0.00001

5-40. An expression written in scientific notation must contain a number between 1 and 10.

5-41. The number 4,980 written in scientific notation is
1. 498×10^1
2. 49.8×10^2
3. 4.98×10^3
4. 0.498×10^4

5-42. The number 0.0214 written in scientific notation is
1. 2.14×10^{-2}
2. 2.14×10^{-3}
3. 0.214×10^{-1}
4. 0.214×10^{-2}

5-43. The number 97,200 is equivalent to
1. 972×10^3
2. 97.2×10^4
3. 9.72×10^4
4. 0.972×10^4

5-44. Which of the following expressions represents an intermediate step in simplyifing $\frac{718 \times 0.0003}{0.0085 \times 75{,}000}$ by using powers of 10?

1. $\frac{(7.18 \times 3) \times (10^2 + 10^{-4})}{(8.5 \times 7.5) \times (10^{-4} + 10^3)}$
2. $\frac{7.18 \times 3}{8.5 \times 7.5} \times 10^2 \times 10^{-4} \times 10^{-3} \times 10^4$
3. $\frac{7.18 \times 10^2 \times 3 \times 10^{-4}}{8.5 \times 10^{-4} \times 7.5 \times 10^4}$
4. $\frac{7.18 \times 10^2 \times 3 \times 10^{-4}}{8.5 \times 10^{-3} \times 7.5 \times 10^4}$

5-45. Using scientific notation, how would the term 0.00000123 be expressed?
1. 0.123×10^{-6}
2. 0.123×10^5
3. 1.23×10^{-6}
4. 1.23×10^6

5-46. The reciprocal of a number is 1 divided by that number. For example, the reciprocal of 50 is $\frac{1}{50}$, which can be expressed as

$$\frac{1}{5 \times 10^1} = \frac{10^{-1}}{5} = \frac{10 \times 10^{-2}}{5} = 2 \times 10^{-2}.$$

Which of the following expressions represents a step in evaluating the reciprocal of 4,500 x 0.000028?

1. $\frac{1}{4.5 \times 10^{-3} \times 2.8 \times 10^{5}}$
2. $\frac{4.5 \times 2.8}{10^{-3} \times 10^{5}}$
3. $\frac{10^{-3} \times 10^{5}}{4.5 \times 2.8}$
4. $\frac{10^{3} \times 10^{-5}}{4.5 \times 2.8}$

5-47. Using scientific notation, how may the computation involving 100,000 x 0.00027 x 0.015 be expressed?
1. 2.7 x 0.015
2. $0.27 \times 1.5 \times 10^{1}$
3. $2.7 \times 1.5 \times 10^{-1}$
4. $2.7 \times 1.5 \times 10^{-2}$

5-48. The factor 4^7 in the denominator of a fraction is equivalent to a factor of 4^{-7} in the numerator of the fraction.

5-49. How may $\frac{12,000 \times 0.018 \times 3.6}{90 \times 400}$ be expressed in scientific notation?
1. 3.6×10^{-2}
2. 2.16×10^{0}
3. 2.16×10^{-2}
4. 0.0036×10^{-3}

5-50. What is the number of significant digits in 6.458×10^{-3}?
1. Two
2. Three
3. Four
4. Five

5-51. If all the terms in the example $\frac{0.00058 \times 41.7 \times 0.005169}{0.0000029 \times 2.16 \times 0.8343}$ are expressed in scientific notation and rounded to one more digit than the number of significant digits in the least accurate term, which of the following, having been rounded to the number of significant digits in the least accurate term, is the correct solution?
1. 2.4×10^{1}
2. 2.04×10^{-1}
3. 3.01×10^{-1}
4. 3.01×10^{0}

5-52. The reciprocal of 2,500 x 0.002 x 0.04 can be expressed as
1. 5 x 1
2. 5×10^{-1}
3. 5×10^{-2}
4. 5×10^{2}

5-53. How is $(10,000 \times 0.003 \times 20)^3$ expressed in scientific notation? [Note: Round the answer to the number of significant digits in the least accurate term of the problem]
1. 2×10^{6}
2. 2×10^{8}
3. 2.16×10^{6}
4. 2.16×10^{8}

5-54. In the expression $\sqrt[3]{18}$, the index is 3 and the radicand is 18.

5-55. When the index of a radical expression is not written, it is understood to be a 3.

5-56. What is the meaning of the expression $\pm\sqrt{9}$?
1. The plus is used before the minus.
2. The minus is used before the plus.
3. The value of the radical is ambiguous.
4. The square root of 9 can either be +3 or -3.

5-57. What is the value of the radicand in the expression $\sqrt[3]{2^6}$?
1. 2
2. 3
3. 6
4. 2^6

5-58. In the expression $6x^2$, six is a coefficient of x^2.

5-59. The radicals $8\sqrt{2}$, $\frac{1}{2\sqrt{2}}$, $\sqrt{\frac{2}{87}}$, and $\sqrt{3}$ can be combined by addition.

5-60. What is the sum of $2\sqrt{10}$ plus $\frac{1}{2}\sqrt{10}$?

1. $\sqrt{10}$
2. $2\sqrt{10} + 5$
3. $2\frac{1}{2}\sqrt{10}$
4. $2\frac{1}{2}\sqrt{20}$

5-61. The answer to the problem $\sqrt{5} - \frac{1}{2}\sqrt{5}$ is

1. $\frac{1}{2}\sqrt{5}$
2. $-\frac{1}{2}\sqrt{5}$
3. $\frac{3}{2}\sqrt{5}$
4. $-\frac{3}{2}\sqrt{5}$

5-62. In order for two radicals to be multiplied they must have the same index and radicand.

5-63. The product of $\sqrt[3]{7}$ and $\sqrt{6}$ is $\sqrt[6]{42}$.

5-64. Which of the following radical expressions are equal?

1. $\sqrt{\frac{3}{7}} = \sqrt[3]{\frac{2}{7}}$
2. $\frac{\sqrt{3}}{\sqrt{7}} = \frac{1}{\sqrt{7}} \times \frac{1}{\sqrt{3}}$
3. $\frac{\sqrt{3}}{\sqrt{7}} = \frac{\sqrt{7}}{1} \times \frac{1}{\sqrt{3}}$
4. $\frac{\sqrt{3}}{\sqrt{7}} = \sqrt{\frac{3}{7}} = \sqrt[2]{\frac{3}{7}}$

5-65. The value of the expression $\frac{2\sqrt{3} \cdot \sqrt{3}}{3}$ in the most simplified form is

1. 2
2. $\frac{2\sqrt{3}}{3}$
3. $2\sqrt{3}$
4. $\frac{2\sqrt{9}}{3}$

5-66. The radicals $\sqrt{13}$ and $\sqrt{4}$ cannot be combined into one radical by addition.

5-67. The computational steps

$$\sqrt[3]{16} = \sqrt[3]{8} \cdot \sqrt[3]{2} = 2\sqrt[3]{2}$$

may be used in solving for the cube root of 16.

5-68. Which of the following simplifications is in error?

1. $\sqrt{18} = \sqrt{9} \cdot \sqrt{2} = 3\sqrt{2}$
2. $\sqrt[3]{250} = \sqrt[3]{125} \cdot \sqrt[3]{2} = 5\sqrt[3]{2}$
3. $\sqrt[4]{16} = \sqrt[4]{2^4} = 2$
4. $\sqrt{51} = \sqrt{49 + 2} = 7\sqrt{2}$

5-69. While 64 is a perfect third power, it is not a perfect sixth power.

5-70. The expressions $\sqrt[5]{7}$ and $7^{\frac{1}{5}}$ are equivalent.

5-71. Which expression is obtained by simplifying the radical $\sqrt{1,575}$?

1. 105
2. $15\sqrt{7}$
3. $45\sqrt{7}$
4. $3^2 \cdot 5^2 \cdot 2\sqrt{7}$

5-72. Using fractional exponents, how may the radical $\sqrt[3]{4^7}$ be written?

1. $4^{3 \cdot 7}$
2. $4^{\frac{3}{7}}$
3. $4^{7 \cdot 3}$
4. $4^{\frac{7}{3}}$

5-73. What is the prime factorization of $\sqrt{3^2 \cdot 7^3 \cdot 5^5}$?

1. $3\sqrt{7^3 \cdot 5^5}$
2. $3 \cdot 7 \cdot 5^2\sqrt{35}$
3. $105\sqrt{5 \cdot 7}$
4. $3 \cdot 7 \cdot 5^2\sqrt{3 \cdot 5 \cdot 7}$

5-74. What is the solution of the expression $\frac{\sqrt[3]{27}}{\sqrt{9}}$?

1. 1
2. $\sqrt[3]{3}$
3. $\sqrt{3}$
4. $\frac{\sqrt[3]{27}}{\sqrt{9}}$

5-75. $\frac{3}{2\sqrt{3}}$ is an example of a rational number.